

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A cleaning unit installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer has a thickness of approximately from 0.5 to 50 percent of a thickness of the second blade.

2. (Original) The cleaning unit according to claim 1, wherein the rotator is an image carrier.

3. (Original) The cleaning unit according to claim 1, wherein the rotator is a paper carrier.

4. (Currently Amended) The A cleaning unit according to claim 1 installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer is made of an elastic material and has abrasive particles accounting for approximately from 50 to 90 percent of a volume of a contact region to the

rotator.

5. (Original) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator over a length approximately from 0.01 to 5 millimeters from a tip of the second blade.

6. (Currently Amended) ~~The A~~ cleaning unit ~~according to claim 1~~ installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the entire second blade is the abrasive layer.

7. (Original) The cleaning unit according to claim 1, wherein the second blade has a base layer not including abrasive particles.

8. (Original) The cleaning unit according to claim 7, wherein the base layer is made of a material selected from the group consisting of a rubber, a resin, and a metal.

9. (Original) The cleaning unit according to claim 7, wherein the base layer is made a rubber with a hardness of approximately from 65 to 85 degrees.

10. (Original) The cleaning unit according to claim 7, wherein the first blade is made of a rubber, and the base layer is made a rubber with a hardness of more than a hardness of the first blade.

11. (Original) The cleaning unit according to claim 1, wherein the abrasive layer is made of a rubber with a hardness of approximately from 65 to 100 degrees.

12. (Original) The cleaning unit according to claim 1, wherein the abrasive layer is made of a rubber with a hardness of approximately from 85 to 100 degrees.

13. (Original) The cleaning unit according to claim 1, wherein the abrasive layer is made of a rubber with a coefficient of dynamic friction of not more than 1.5.

14. (Original) The cleaning unit according to claim 1, wherein the abrasive layer includes abrasive particles of approximately from 0.5 to 50 weight percent.

15. (Currently Amended) ~~The A~~ cleaning unit ~~according to claim 1~~ installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer has abrasive particles with a ratio to a volume of a contact region to the rotator, the ratio being gradual with regard to a thickness of the abrasive layer.

16. (Currently Amended) ~~The A~~ cleaning unit ~~according to claim 1~~ installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer has a ~~rich~~ layer accounting for not less than 50 percent of a volume of a contact region to the rotator, and the ~~rich~~ layer has a thickness of approximately

from 5 to 100 micrometers.

17. (Currently Amended) ~~The A~~ A cleaning unit ~~according to claim 1~~ installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer includes a mixture of abrasive particles of at least one of different average particle size and different materials.

18. (Original) The cleaning unit according to claim 1, wherein the abrasive layer includes ceric oxide.

19. (Currently Amended) ~~The A~~ A cleaning unit ~~according to claim 18~~ unit installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer includes ceric oxide, and

wherein the abrasive layer includes ceric oxide with a purity of not less than 80 percent.

20. (Original) The cleaning unit according to claim 1, wherein the abrasive layer has abrasive particles with an average particle size of approximately from 0.05 to 100

micrometers.

21. (Original) The cleaning unit according to claim 1, wherein the second blade has a cut edge formed by cutting a part of an edge of the second blade, the cut edge being in contact with the rotator.

22. (Currently Amended) ~~The~~ A cleaning unit according to claim 21 installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the second blade has a cut edge formed by cutting a part of an edge of the second blade, the cut edge being in contact with the rotator, and

wherein the cut edge has a curvature of approximately from 5 to 150 micrometers.

23. (Original) The cleaning unit according to claim 21, wherein the cut edge is formed at the time of forming of the second blade from an elastic sheet.

24. (Original) The cleaning unit according to claim 23, wherein the cut edge is cut in an inclined direction with respect to the elastic sheet.

25. (Original) The cleaning unit according to claim 1, wherein a contact region to the rotator, of the second blade, is cut by idle running of the rotator.

26. (Currently Amended) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator in a trailing ~~form~~ location with respect to a rotation direction of the rotator.

27. (Currently Amended) The cleaning unit according to claim 26, wherein the first blade is in contact with the rotator in ~~a countering form~~ a countering direction with respect to a rotation direction of the rotator.

28. (Currently Amended) The cleaning unit according to claim 1, wherein the first and second blades are in contact with the rotator in ~~a countering form~~ a countering direction with respect to a rotation direction of the rotator.

29. (Original) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator, with a contact angle of approximately from 5 to 25 degrees.

30. (Original) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator, with a contact pressure of approximately from 10 to 80 gf/cm.

31. (Original) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator, with a contact pressure of approximately from 10 to 60 gf/cm.

32. (Original) The cleaning unit according to claim 1, wherein the second blade is in contact with the rotator to make a dent of approximately from 0.2 to 1.5 millimeters in the rotator.

33. (Canceled)

34. (Original) The cleaning unit according to claim 1, wherein the second blade has a vibration mechanism.

35. (Currently Amended) ~~The A cleaning unit according to claim 34~~ installed in an image forming apparatus comprising:

a first blade located where a part of the first blade is in contact with a rotator constituting the image forming apparatus to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the second blade has a vibration mechanism, and

wherein the first blade has a vibration mechanism to vibrate with a phase that is different than a vibration phase of the second blade.

36. (Currently Amended) A process cartridge that is detachably installed in an image forming apparatus, comprising:

a rotator where residue is adhered in the image forming process; and
a cleaning unit that has

a first blade located where a part of the first blade is in contact with the rotator to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not removed by the first blade,

wherein the abrasive layer is made of an elastic material and has abrasive particles accounting for approximately from 50 to 90 percent of a volume of a contact region to the rotator.

37. (Canceled)

38. (Original) The process cartridge according to claim 36, wherein the second blade has a base layer not including abrasive particles.

39. (Currently Amended) An image forming apparatus comprising:

a rotator where residue is adhered in an image forming process; and
a cleaning unit that has

a first blade located where a part of the first blade is in contact with the rotator to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not-removed by the first blade,

wherein the abrasive layer has a thickness of approximately from 0.5 to 50 percent of a thickness of the second blade.

40. (Original) The image forming apparatus according to claim 39, further comprising:

an image carrier that carries a latent image;

a charging unit that uniformly charges a surface of the image carrier;

an exposing unit that exposes the surface of the image carrier charged according to image data and writes the latent image on the surface;

a developing unit that supplies toner to the latent image formed on the surface of the image carrier and visualizes the image; and

a transferring unit that transfers the image visualized on the image carrier, to a paper, wherein

the rotator is the image carrier.

41. (Original) The image forming apparatus according to claim 39, further comprising:

a first image carrier that carrier a latent image;

a charging unit that uniformly charges a surface of the first image carrier;

an exposing unit that exposes the surface of the first image carrier charged according

to image data and writes the latent image on the surface;

a developing unit that supplies toner to the latent image formed on the surface of the first image carrier and visualizes the image;

a second image carrier;

a transferring unit that transfers the image visualized on the first image carrier to the second image carrier once and transfers the image transferred on the second image carrier, to a paper, wherein

the rotator is the second image carrier.

42. (Original) The image forming apparatus according to claim 39, further comprising:

an image carrier that carries a latent image;

a charging unit that uniformly charges a surface of the image carrier;

an exposing unit that exposes the surface of the image carrier charged according to image data and writes a latent image on the surface;

a developing unit that supplies toner to the latent image formed on the surface of the image carrier and visualizes the image;

a transferring unit that transfers the image visualized on the image carrier to a paper;

and

a paper carrier that carries the paper, wherein

the rotator is the paper carrier.

43. (Original) The image forming apparatus according to claim 39, wherein the toner has a volume average particle size of approximately from 3 to 8 micrometers and a ratio

Dv/Dn, of the volume average particle size Dv to a number average particle size Dn, of approximately from 1.00 to 1.40.

44. (Original) The image forming apparatus according to claim 39, wherein the toner is prepared by allowing a toner solution to undergo at least one of a cross linking reaction and an extension reaction in an aqueous medium, and the toner solution is a mixture of a polyester prepolymer that has a functional group with a nitrogen atom, a polyester, a colorant, and a mold releasing agent in an organic solvent.

45. (Original) The image forming apparatus according to claim 39, wherein the toner has a shape factor SF-1 of approximately from 100 to 180 and a shape factor SF-2 of approximately from 100 to 180.

46. (Original) The image forming apparatus according to claim 39, wherein the toner includes particles each having roughly spherical shape.

47. (Currently Amended) ~~The~~ An image forming apparatus ~~according to claim 39~~ comprising:

a rotator where residue is adhered in an image forming process; and

a cleaning unit that has

a first blade located where a part of the first blade is in contact with the rotator to remove residue on the rotator; and

a second blade located where a part of the second blade is in contact with the rotator and having an abrasive layer, to remove residue not-removed by the first blade,

wherein

the toner has a shape regulated by a major axis r1, a minor axis r2, and a thickness r3,

a ratio of the minor axis r_2 to the major axis r_1 is in a range of 0.5 to 1 and

a ratio r_3/r_2 of the thickness r_3 to the minor axis r_2 is in a range of 0.7 to 1.0, where $r_1 \leq r_2 \leq r_3$.

48. (Currently Amended) The image forming apparatus according to claim 39, wherein

the toner has host particles with a charge controlling agent, is obtained by externally adding at least fine particles of silica and is prepared by a process includes

preparing a toner solution by ~~dispensing~~ dispensing a colorant, a polyester, a prepolymer, and a mold releasing agent in an organic solvent;

emulsifying the toner solution in an aqueous medium with a surfactant and fine particles of a resin;

allowing a prepolymer to undergo polyaddition reaction in the toner solution emulsified; and

cleaning and drying the solution reacted.

49. (Original) The image forming apparatus according to claim 39, wherein the charge controlling agent has a ratio M/T , of weight M of the charge controlling agent on surfaces of the host particles to weight T of the charge controlling agent in the host particles, of approximately from 100 to 1000.

50.-54. (Canceled)